Smart Tourism (2020) Volume 1 Issue 2, *11 pages*.
doi: 10.54517/st.v1i2.1697

Asia Pacific
Academy of Science Pte. Ltd.

ORIGINAL RESEARCH ARTICLE

Smart tourism destination, physical experience and rural tourism

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ABSTRACT

The STD paradigm must consider the relevance of technology, not only as a management component, but also as an attribute of the tourist experience at the destination. The concept of physical experience is emerging as an important challenge for the design of each STD, and there may be relevant differences between types of destinations.

This paper studies the STD/Physical binomial as the case of the chicken and the egg. It is based on field work in a rural destination, and builds a model that defines and values the concepts of Utility and Value of Technology for its visitors, integrating the main current technological applications in the STD.

The results allow us to observe how mobile, online/ontime technology is a permanent part of the tourist behavior, and of the creation of a new type of personalized experience that.

***Keywords*:** smart; ICT; co-creation; STD; physical experience; tourist destination

1. Introduction

The word smart is very fashionable in tourism[1]. In a literal sense it can be assimilated to intelligence, adding the anticipation of tourists' needs thanks to information technologies (ICTs)[2]. The key is to match a technological (wireless) omnipresence with the generation of individual on-site experiences.

Smart Tourism (ST) involves three main components: the Smart Destination, whose key aspect is the integration of ICT into the tourism infrastructure through sensors, smart devices and Big Data employed within a given geographic space[3]; the Smart Business, understood as the generation of interactive platforms that facilitate interaction and personalization of experiences[4]. Physical behavior is the result of integrating ICT as a main component of tourism experiences[2].

The impact of ICT within destination marketing needs to be focused[5]. The DMO (Destination Management Organization) paradigm has been launched with its foundation in the concepts of tourist experience and dissatisfaction, to develop tourism products, quality and brand image[6] based on market knowledge[7]. DMOs have a facet of action/reaction that using Big Data can search, and fit, "all the needles of a haystack" that correspond to a tourist, who, in a precise place and time, performs a specific activity. With the DMO appears the Prosumer tourist,

ARTICLE INFO
Received: July 23, 2020 | Accepted: August 31, 2020 | Available online: September 15, 2020

CITATION
Ballina Ballina FJ. Smart tourism destination, physical experience and rural tourism. Smart Tourism 2020; 1(2): 11 pages.

who consumes and produces information simultaneously[8], clear antecedent of the co-creation tourist[1].

However, the enormous development of WIFI technology and, above all, of 4G connectivity has meant a total dissemination of tourist information that transcends the physical and temporal limits of DMOs. Mobile technology is integrating multiple technological applications such as GIS, Virtual Reality, Augmented Reality, Internet of Things giving rise to a sixth sense in the individual-tourist. That is why, the literature is going beyond the DMOs to propose a new paradigm of knowledge in tourism: the "Smart Tourism Destination" (STD)[9–12].

The term STD is used to refer to ubiquitous digital technologies such as: Internet of Things (IOT) sensors, Open Data, Cloud Computing, Geopositioning Systems (GIS), Artificial Intelligence, Machine Self-Learning or Cognitive Computing, to create a "hyper-connected" skin on the body of tourists[13] that facilitates them to generate personalized tourism experiences[14]. As indicated by Li et al.[2] STD means doing the right thing in the face of various complex circumstances.

Thus, STD becomes meaningful as technology converges with the tourism experience, giving rise to the Physical concept. That is, intelligent decision making should produce the best experiences for tourists[15]. Effectively, ICT moves from being a mediator of experiences to understanding their core, Co-creation and ICT combine to form a holistic, immersive and pervasive experience[2]. The term Physical describes the symbiosis of physical space and virtual space[16]: "The physical experience consists of hybridizing the physical and digital components at the same time and in the same place"[17].

Tourists' perception of the technological developments of the STD, and the level of consistency with their expectations, attitudes and behaviors, will depend on the reality of the destination's success. If the co-creation tourism experience is characterized by an intense use and exchange of information with tourists' "mobile" technological elements[18], the study of tourists' interrelationships with them should form a fundamental principle for understanding the STD. Which however has not been adequately studied[19,20].

Most of the work done on tourists and their use of ICTs has focused on market segmentation. Thus, TripBarometer-2016 proposes using mobile use in travel as a main segmentation variable. Redondo[21] distinguishes between: tourist 1.0 (Consumer), tourist 2.0 (Prosumer) and tourist 3.0 (Adprosumer), according to the degree of involvement of technology in their trip. In relation to this typology, more recently González[22] establishes five central characteristics of the 3.0 tourist including Alternative, Conscientious, Connected and updated, Recommended and Influential.

In addition, most works study the impact of only some type of technology, with an evident need for research on the fusion of technologies in tourism experiences[23], and more specifically on the concept of physical experience.

Another important academic gap concerns the study of STD in rural and/or nature destinations. Practically all research has focused on large cities that are tourist destinations, where technological capabilities and innovations function almost as pioneers. In contrast, rural destinations have made little progress in the adoption of tourism co-creation ICTs, with a delay in the implementation of digital technology[24,25], which, if anything, have concentrated on technological applications to the sustainability of the destination[26].

According to such issues, the present work aims to incorporate new demand-side research on STDs. Specifically, the aim is to achieve to verify the existence of technological conditioning factors of tourists when developing their co-creation experience in a destination. Without following an approach of segmentation but, on the contrary, of causal relationships between tourist, technology and destination. Moreover, it is a small rural or nature type destination, which allows to lighten the high influence of

technology in the urban way of life.

2. Methodology

The term experience carries the concept of value[27], immediately tourists assign different values to their experiences. Likewise, co-creation adds value to the tourism experience[28], by incorporating the resource technology, as a factor to enhance it, through the strong interaction of the tourist with the attractions and with other tourists[23,29]. Therefore:

H1: The usefulness of new interaction technologies between tourists and different tourism services in the destination has a positive effect on the value of the co-creation experience in rural STD.

The positive consequences of the valuation of STD destinations in the context of experience tourism are represented by the concepts of: satisfaction and level of expenditure, which are considered units of measurement, both for tourists and destination agents[30]. On both concepts a positive effect can be expected[31–34], therefore:

H2: Strategies that lead to a higher valuation of a rural STD destination produce higher perceived satisfaction in tourists and better economic results, in terms of stay, to the destination.

For tourists, digital technologies have become a critical travel tool[35], hence destinations are adding technological utilities to their marketing practices to attract visitors[36], firstly, and to increase satisfaction with the tourist stay, secondly.

Mobile technologies have a significant impact on consumer attitudes and purchase intentions[37], which directly affects destinations. However, a distinction should be made between those that influence trip planning, on the one hand, and those that influence decisions to hire services at the destination[38].

H3: The total utility of technologies in rural STD depends on the tourist's interest in technologies for personal enjoyment (mobile) and those for social relations (social media).

But, since there are different technological utilities developed, and implemented, by destinations[39–41], it can be proposed that:

H3.1: There are differences between technological applications in rural STD tourism destinations in relation to the value they bring to the technological utility for the specific experience.

In a graphic way, **Figure 1** allows to present, and relate, the objective of the work with the hypotheses raised.

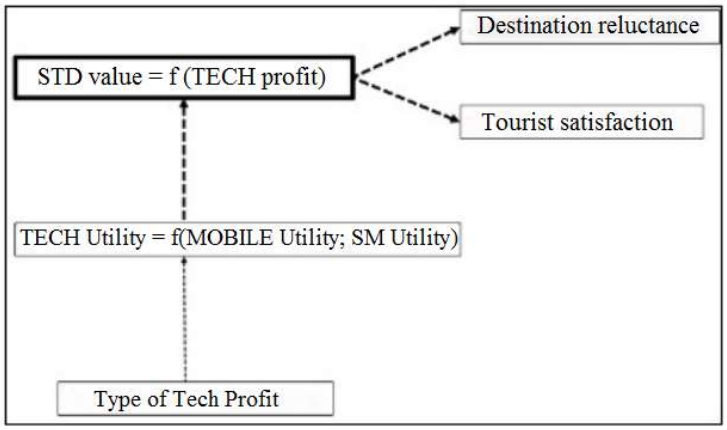

Figure 1. Relationship of hypotheses of the work. Source: Own elaboration.

The information used corresponds to the data provided by means of a personal survey of tourists, exclusively vacationers, in the rural Asturian municipality of Taramundi (Spain), according to the technical characteristics indicated in **Table 1**. The selected database has operated with three large groups of variables. Firstly, those corresponding to the role

of technology in general on tourist behavior. Secondly, the technological utilities proposed at the destination. Finally, variables representative of their effects on average stay and satisfaction. **Table 2** shows these variables and the measurement scales used.

Table 1. Technical specifications of the work. Source: Own elaboration

Population and sampling unit	**Vacation tourists**
Scope	Municipalities/Councils of Taramundi and Giión
Date of Work	October to December 2016 Medium and low season
Information Collection Method	Personal survey, carried out in hotel establishments and in places of tourist interest.
Sampling Procedure	Discretionary
Number of respondents	115
Sampling Conditions	Z at 95%, P = Q = 0.5cdf
Sampling Error	±4.35%

Table 2. Basis of variables and scales. Source: Own elaboration

Block	**Variables**	**Scale**
Technology and tourism	■ What I see on social networks influences my opinion about a tourist destination. ■ Technologies help me to have a more satisfying experience as a tourist ■ Technologies are a fundamental part of my travels ■ Technologies are a useful tool in my travels ■ I am concerned that a company can record and store my activity in my tourist destination ■ I would let tourism companies obtain my personal data through the Internet in exchange for offers, discounts or personalized services. ■ I value positively that my destination tries to innovate and use technologies to improve my experience as a tourist. ■ I trust what other tourists say on portals such as TripAdvisor or Booking. ■ This destination is innovative, it always gives new experiences to tourists.	Likert (1 to 5)
Technological utilities	■ Touch screens in tourist offices or on the streets of the destination ■ Official accounts of the destination on social networks ■ Official website of the destination in several languages, with videos, photos, possibility of booking activities... ■ Online assistance from the Tourist Office (telephone, chat, Skype). ■ QR codes ■ Free Wi-Fi public ■ Free Wi-Fi in the destination's businesses ■ Official destination apps for Smartphone or Tablet. ■ Audio guides ■ Video guides ■ Online reservations on the destination's website ■ Mobile payment ■ Multipurpose tourist card (transport, museums)	Nominal (Yes or No) and subsequent Likert (1 to 5)
Results	■ Number of nights spent in the destination ■ Degree of satisfaction	Metric

3. Results

The statistical analysis of the data was carried out with the IBM SPSS v.20 program, developing the different types of contracts according to the hypotheses put forward. Firstly, the rating of a Smart Tourism Destination was estimated from the direct responses of the tourists interviewed. As can be seen in **Figure 2**, practically two out of three tourists give the highest rating, of points, to it, with an average of 4.41 (for a significant α).

To form the variable "Usefulness of Technology", and estimate its value by tourists, a correspondence factor analysis (CFA) has been carried out with the scores given to the technology questions in general. Before presenting the results of this analysis, it is necessary to highlight a finding of interest: the issues related to data privacy and its use by tourism providers do not exceed the minimum communalities to operate in the CFA, so they are eliminated from it, to be analyzed later.

As can be seen in the set of results presented in

Table 3, the ACF is valid, both from the measurement of the reliability of the scale (with a cronbach's α greater than 0.7), as well as the validity tests (either Bartlett's test, significant, or the KMO measure, greater than 0.7).

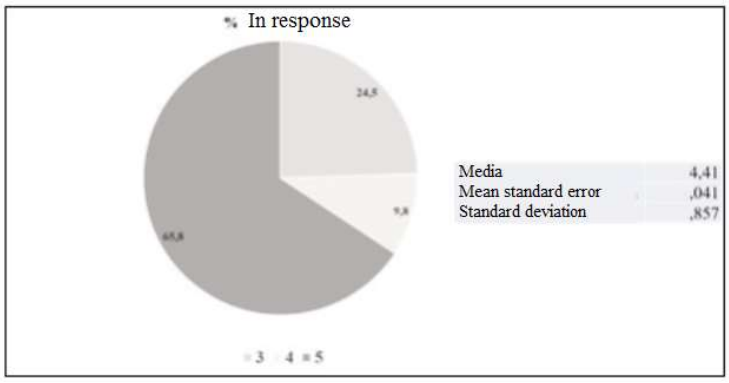

Figure 2. Straightforward assessment of the DIT. Source: Own elaboration.

Table 3. Correspondence factor analysis of the technology items. Source: Own elaboration

Reliability statistics						
Cronbach's alpha	N of items					
0.764	5					
KMO and Bartlett's test						
Meelida-Kaiser-Meyer-Olkin sampling suitability				0.729		
Bartlett's test of sphericity	Approx. Chi-square			2,091.002		
	gl			10		
	Gis.			0.000		
						Extraction
What I see on social networks influences my opinion about a tourist destination.						0.896
Technologies help me to have a more satisfying experience as a tourist.						0.933
Technologies are a key part of my travels.						0.930
The technologies are a useful tool in my travels.						0.667
I trust what other tourists say on portals like trip advisor or Booking						0.901
Component	Initial eigenvalues			Rotational sums of squared loadings		
	Total	% of variance	% cumulative	Total	% of variance	% cumulative
1	2.784	55.690	55.690	2.527	50.545	50.545
2	1.542	30.846	86.535	1.800	35.991	86.535
3	0.450	9.009	95.544			
4	0.201	4.024	99.568			
5	0.022	0.432	100.000			
					Component	
					1	2
Technology helps me to have a more satisfying experience as a tourist.					0.963	
Technologies are a fundamental part of my travels					0.959	
Technologies are a useful tool in my travels					0.803	
I trust what other tourists say on portals such as trip advisor or booking						0.948
what I see on social networks influences my opinion of a tourist destination						0.929

Two principal components are generated, accumulating 85% of the variance, which distinguish between the technological items, in component C1, and the opinion technology items, in component C2. In both cases with high weights of the initial variables. The values of both components have been kept as dummy variables for the formation of the value of technology for the tourist.

As previously indicated, we have operated with the items of confidentiality of the data, according to the values given by the tourists. Thus, a new variable has been generated, called "data sharing", calculated, for each tourist, as the difference between his concern for his personal data and its possible sharing in exchange for certain tourist advantages. As the statistics in **Table 4** show, the mean value is negative, although its α is slightly above .05. The implication

is that tourists are willing to give up tourist behavior data if the service providers compensate them in some way that is of interest to them.

With the two components plus the new variable, derived from the items on technology, the evaluation of the "Usefulness of Technology" has been calculated for each tourist. **Table 5** shows the descriptive statistics of this result. With a positive mean of 0.12 points, with an α slightly higher than the recommended 0.5.

Table 4. Artificial variable "transfer of information" of the tourist. Source: Own elaboration

	Mean		**Standard deviation**
	Statistic	Standard error	Statistic
Data prevention minus data compensation	-0.3878	0.08003	1.68057

Table 5. Utility value of technology. Source: Own elaboration

	Minimum	**Maximum**	**Mean**		**Standard deviation**
	Statistic	Statistic	Statistic	Standard error	Statistic
Net value importance of technology	-1.75	1.92	0.1246	0.07157	0.76752

The relationship between the variable of interest, rural STD value, and the utility of the technology has been studied by means of a linear regression that can determine the existence of a hypothetical dependence. As reflected by the various statistical results in **Table 6**, the regression analysis is corrective, the R2 and adjusted R2 values are between .44 and the recommended .89, the variance of the residuals is far from the variance of the variable, and the significance of the model is 000 for the independent variable.

The standardized coefficient R2 has a positive value of 211, which indicates that there is a positive dependence relationship for the STD Value variable, such that each unit of value is produced by 21% by the perceived usefulness of the technology by tourists.

On the other hand, in order to consider the contribution of the types of technological applications that the destinations offer to the Utility of Technology, generated in the model, a simple discriminant analysis (SDA) has been carried out to determine those most valued by the most technologically involved tourists versus the least (although their real value should be referred to as average value).

Table 6. Linear regression value of the STD with respect to usefulness of the technology. Source: Own elaboration

Model		**R**	**R-squared**	**R-squared adjusted**	**Standard error of the estimation**	**Change in R-squared**	
1		0.860[a]	0.074	0.073	0.338	0.074	
Model			Sum of squares		gl	Root mean square	F
1	Regression		14.427		1	14.427	20.533
	Residue		308.462		114	0.703	
	Total		322.889		115		
Model			Unstandardized coefficients		Standardized coefficients	t	Sig.
			B	Standard error	Beta		
1	(Constant)		4.441	0.040		109.924	0.000
	Net asset value technology		0.238	0.052	0.211	4.531	0.000

Table 7 presents the main statistical results of the ADS, determining the existence of eight clearly explanatory technological applications, namely: touch screens, online assistance from the tourist office, free business WIFI and public WIFI, apps, audio guides, video guides and mobile payment. The statistical contrasts of the analysis give it a certain robustness: in the value of the canonical correlation, value of the Wilks' lambda, and significance of the chi-square test. The values of the standardized function coefficients, in conjunction with the centroids of the STD values, allow us to determine that:

The maximum value corresponds to the technological applications of: free WIFI in destination businesses, video guides and mobile payments.

The average value is related to most of the existing applications: touch screens, online assistance from the tourist office, public WIFI, apps and audio guides.

The last analysis carried out has tried to determine the existence of relationships between the value of the STD and the results of the destination, in terms of average stay (number of nights) and tourist satisfaction rating. For this purpose, a linear regression analysis was again used, relevant in terms of R2, adjusted R2, variance of the residuals and significance levels of the ANOVA, as shown in **Table 8**.

Table 7. ADS statistics of the technological applications of the destinations. Source: Own elaboration

				Statistic	**Sig.**
1	VALUE Video-guides			0.415	0.000
2	VALUE Touchscreens in tourist offices or on the streets of the destination			0.382	0.000
3	VALOR Free Wi-Fi in destination businesses.			0.358	0.000
4	VALUE Online assistance from the tourist office (by phone, chat, Skype...)			0.345	0.000
5	VALUE Mobile payment			0.338	0.000
6	VALUE Audioguides			0.330	0.000
7	VALUE Free public Wi-Fi			0.321	0.000
8	VALUE Official destination apps for smartphone or tablet.			0.315	0.000
Function	Eigenvalue	% of variance	Cumulative %	Canonical correlation	
1	2.176[a]	100.0	100.0	0.328	
Function test	Wilks' Lambda	Chi-square	gl	Sig.	
1	0.915	453.035		0.000	
Standardized canonical discriminant function coefficients				Function 1	
VALUE Touch screens in tourist offices or on the streets of the destination				0.306	
VALUE Online assistance from the tourist office (by phone, chat, Skype...)				0.230	
VALUE Free public Wi-Fi				0.310	
VALUE Free Wi-Fi in destination businesses				-0.403	
VALUE Official destination apps for smartphones or tablets				0.165	
VALUE Audioguides				0.393	
VALUE Video guides				-0.581	
VALUE Mobile payment				-0.290	
	Function 1				
MEDIO	2.411				
MAXIMUM	-0.898				

Table 8. Linear regression value of STD with respect to Outcomes. Source: Own elaboration

		Mean	
Value of innovative destination in experiences		4.41	
Number of nights?		4.02	
Degree of satisfaction		7.56	
		Rating of innovative destination in experiences	Degree of satisfaction
Pearson correlation	Rating of innovative destination in experiences	1.000	0.873
	Number of nights?	0.486	0.427
	Degree of satisfaction	0.873	1.000
Sig. (one-sided)	Rating of innovative destination in experiences		0.000
	Number of nights?	0.000	0.000
	Degree of satisfaction	0.000	

Model	R	R-squared	Adjusted R-squared	Standard error of the estimate	Change eπ R-squared
1	0.873[a]	0.762	0.761	0.419	0.762
2	0.925[b]	0.855	0.854	0.327	0.093

Table 8. (*continued*)

ANOVA model		Sum of squared ratios	gl	Mean square	Sig
1	Regression	245.971	1	245.971	0.000[t]
	Residue	76.918	114	0.175	
	Total	322. B89	115		
2	Regression	276.012	2	138.006	0.000[c]
	Residue	46.877	113	0.107	
	Total	322.889	115		

Model		Unstandardized coefficients		Standardized coefficients	Sig.
		B	Standard error	Beta	
1	(Constant)	1.886	0.070		0.000
	Degree of satisfaction	0.334	0.009	0.873	0.000
2	(Constant)	4.086	0.159		0.000
	Degree of satisfaction	0.195	0.011	0.510	0.000
	Number of nights?	0.037	0.011	0.066	0.001

In view of all previous results, it should be noted that the hypotheses are explained:

- H1: Rural STD Value is favored, at a coefficients' of .211, by tourists' valuation of technology.

- H2: The Value of rural STD contributes positively on destination performance, in tourist satisfaction and average stay (with coefficients' of .51 and .06, respectively).

- H3: The Technological Utility of the rural tourist is composed of two dimensions: individual and own Smartphone and social media opinion sharing. Adding, as an influence variable, the compensation to the tourist for the personal data obtained.

- H3.1: There are technological applications in the destinations with a higher valuation power of rural STD, while others, most of them, are already assumed as current.

Consequently, in a graphic form (see **Figure 3**) it is possible to consider the fulfillment of the hypotheses.

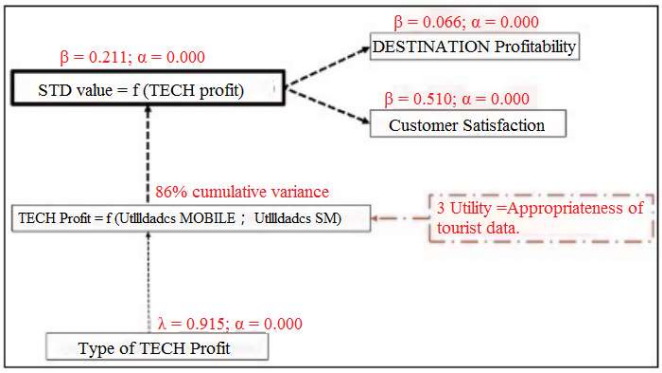

Figure 3. Statistical results of the hypothesis contrasts. Source: Own elaboration.

4. Conclusions

Technology has a preponderant role in the current consumer's way of life, assuming its own value in the development of their consumption experiences, more specifically in the case of tourism services[22]. The Smart Tourism Destination (STD) paradigm must understand that it develops two different highly interconnected facets: it is a methodology of on time management of destinations, through important technological tools for obtaining, selecting and analyzing the information of "everything" that happens in the destination[10,11,42], but that its results, in the form of knowledge, have the main objective of redesigning the most appropriate offers, at each time and place, to the experiences demanded by tourists[2].

As the results of the work indicate, the tourist actively participates in the design and development of his experience through a process of co-creation of high technological value[14], that is, the technology itself becomes an end within it. The tourist does not understand a destination or a tourism experience without the incorporation of technological resources with which to interact actively[29].

The incorporation of technology in STD/DTI destinations, from the tourists' position, becomes so important that it produces positive effects on direct returns, of economic type such as average stay, and indirect, of communicative type (social media) such as tourist satisfaction[41].

Now, the instrumental value of technology for tourists has two main facets: those that determine the improvement of their interaction with the attractions of the destination (incorporated into their smartphone)[43], on the one hand, and those that influence the emission and reception of information of their interest, in online and on time mode (the social media)[41]. There are technological applications implemented by destinations with greater valuation power for the STD by the tourist than others[17]. Only some give a higher power, while most of them are already seen by the tourist as presupposed, that is, of assumed existence as obvious.

It is relevant to consider the moderating role that the transmission of confidential information to the STD system plays in such valuation[16], in such a way that although the issue is of concern this is lessened by the introduction of compensation proposals, more or less direct, to the tourist.

Moreover, all this is demonstrated in a small rural and nature destination, very different from the large Smart Cities projects of some large tourist destinations, which reinforces the value of the results at a general tourist level. Of course, there may be specific differences in STD and Physical experience management between different types of destinations. For example, one might expect a greater brake on technological globalization for rural tourists, whose travel motivations are specific[24]. This, however, does not limit accepting the importance of the physical experience in tourism, but, on the contrary, the variability in its design according to the type of destination and tourist.

The results should be considered as the product of a first work on the role of technology as an end, and not only as a means, of the Physical tourism experience (by technological co-creation), since, being based on a personal survey, it has some limitations to be considered. The first is the size of the sample itself, because although it is representative in relation to the number of lodging places in the rural destination, it limits its capacity for extrapolation outside it. The second, and more important, is to offer data based on the opinions of tourists and not on the effectiveness of the same. Both issues should mark the authors' successive works, operating with larger samples and incorporating more direct sources of information.

In any case, their results are interesting and novel for understanding the role of ICTs in tourism, and their contribution to the development of tourists' physical experiences, within an environment of global intelligence.

Conflict of interest

The author declares no conflict of interest.

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